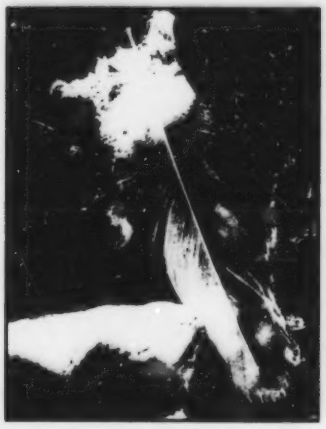
Naturally North

THE NATURAL REGIONS OF NUNAVUT

Natural Regions of Nunavut

Imagine for a moment that you are floating in space, looking down on Canada. You can see no roads, no railways, no cities, no political boundaries. Just land, large lakes, faint tracks of rivers, islands, and seas. You can tell prairies from mountains, boreal forest from tundra. You can see large weather systems moving across the face of the land. It is a compelling view, and it puts the immensity of the natural world into perspective.

These glimpses remind us of our place in the natural world. What you are seeing are natural regions, areas of similar characteristics and conditions, all interacting. Each region has its own physical features: hills, rivers, plains, lakes, and coastlines. Each has its own climate and soils, its own predominant weather patterns. These affect the distribution of plants, and the plants in turn affect the animals that occupy an area.



Now, from your perch in space, look to the northeast, where islands intermingle with the white of the polar ice, and to the north of the great inland sea that is Hudson Bay. This is Nunavut, 1,900,000 square kilometres; home to just 23,000 people. This is a vast land, from top to bottom equal to the distance from Toronto to Vancouver. As you gaze upon it, you can pick out different natural regions: the mountains of the eastern Arctic crowned with icecaps, the Arctic archipelago or the forested taiga.

TABLED DOCUMENT NO. 71-13(5) TABLED ON MAR 0 2 1998

100-07406/

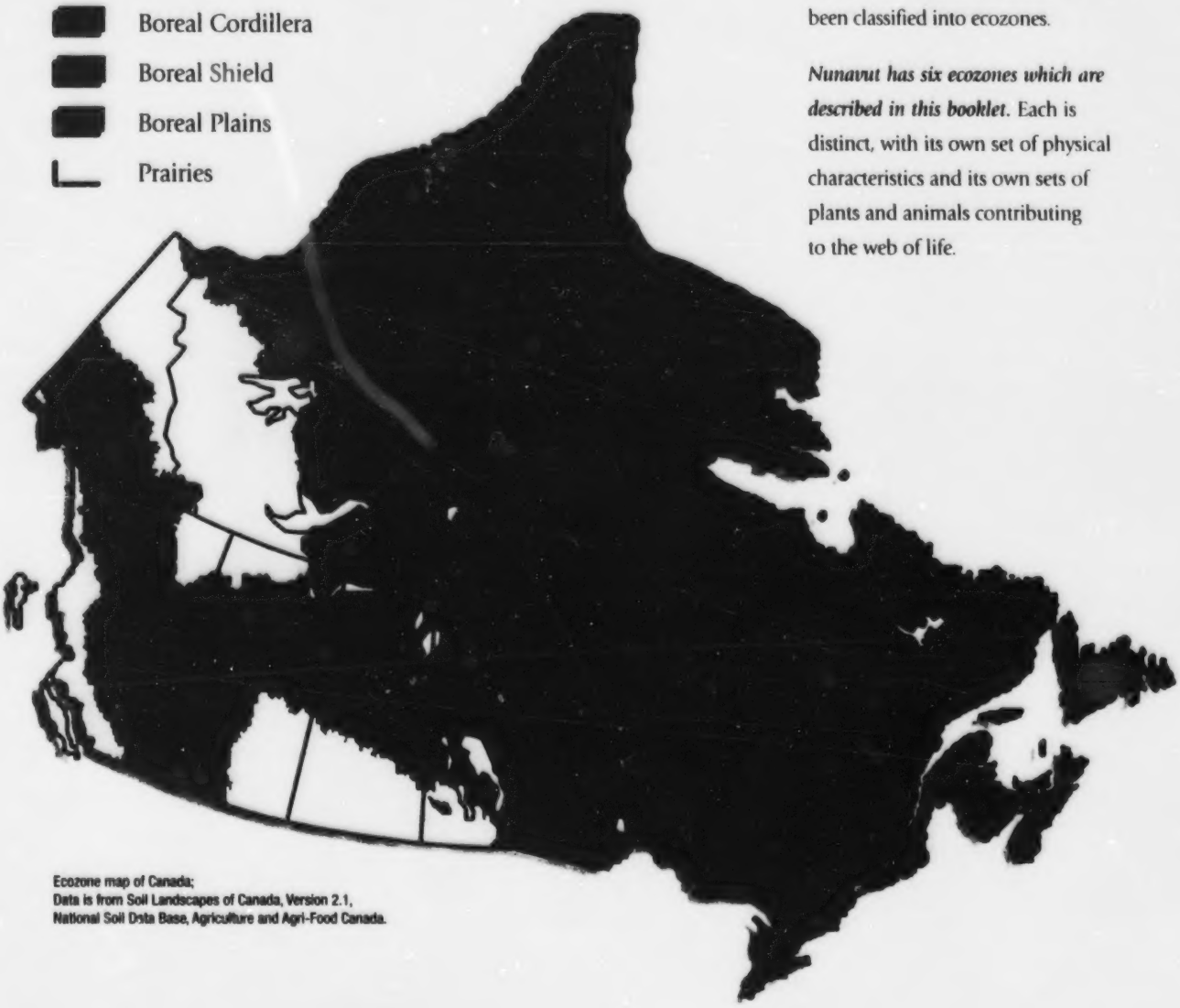
Ecozones of Canada

- Arctic Cordillera
- Northern Arctic
- Southern Arctic
- Taiga Cordillera
- Taiga Plains
- Taiga Shield
- Hudson Plains
- Boreal Cordillera
- Boreal Shield
- Boreal Plains
- Prairies
- Montane Cordillera
- Pacific Maritime
- Mixedwood Plains
- Atlantic Maritime
- Arctic Archipelago (marine)

Ecozones

The combination of landscape, climate and living things gives a natural region its character. These regions are also known as ecozones. All of Canada has been classified into ecozones.

Nunavut has six ecozones which are described in this booklet. Each is distinct, with its own set of physical characteristics and its own sets of plants and animals contributing to the web of life.



Ecozone map of Canada;
Data is from Soil Landscapes of Canada, Version 2.1,
National Soil Data Base, Agriculture and Agri-Food Canada.

Southern Arctic

Ecozones of Nunavut

- Arctic Cordillera 6
- Northern Arctic 8
- Arctic Archipelago (marine) 10
- Southern Arctic 12
- Taiga Shield 14
- Hudson Plains 16

Hudson Plains

Taiga Shield

Northern Arctic

Ecozones of Nunavut

- Arctic Cordillera
- Northern Arctic
- Arctic Archipelago (marine)
- Southern Arctic
- Taiga Shield
- Hudson Plains

Arctic Cordillera

Arctic Archipelago Marine

Icecaps, glaciers and nunataks, lofty peaks and sweeping vistas — some of the world's most dramatic mountain scenery occurs in

Arctic Fox

the Arctic's Mountain Crown

Great icecaps crown Baffin Island and extend north to Bylot, Devon and Ellesmere Islands. Approximately 5% of the total arctic land area lies under permanent ice. Icecaps occur on highlands with summits extending above the permanent snowline.

Icecaps are snow that has accumulated over hundreds or thousands of years. The weight of the upper layers compacts the buried layers until they become ice and begin to flow slowly outward. Outflow glaciers form where icecaps stream over the edges of their highlands. They wind down valleys to lower elevations, often to the sea, where they calve off immense icebergs.

These are "cold" glaciers, remnants of the vast continental ice sheets of the Pleistocene. Unlike glaciers of temperate zones, "cold" glacier ice is far below the freezing point of water. It is frozen to bedrock, so the flow consists entirely of

shearing within the ice. "Warm" glaciers produce great outflows of water from deep inside. Cold glaciers do not; all outflow is surface melt.

The Arctic Cordillera Ecozone consists of high mountain peaks, cirque glaciers, icecaps and outflow glaciers, which become tidewater glaciers where they meet the sea. Because glaciation was formerly more extensive, there are numerous glacial land forms such as U-shaped valleys, steep-sided fiords, bowl-like cirques, peaks surrounded by ice ("nunatuks") and knife-edged ridges ("aretes").

At the lower elevations, the Arctic Cordillera features sheltered valleys, braided streams and pockets of tundra meadows that are rich with flowers in summer. But since more than 75% of the cordillera consists of ice and bare rock, soils are almost nonexistent. Most of the moisture is tied up in ice or whipped away by the fierce winds. Plants such as purple mountain saxifrage, mountain aven, arctic poppy, moss campion, arctic white heather and mountain sorrel cling to the ground in dense mats or cushions.

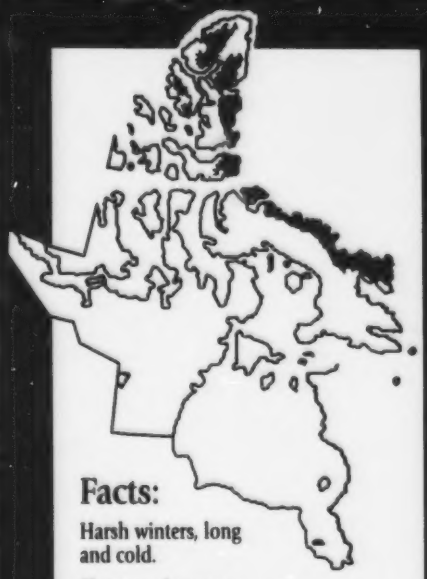
Due to the lack of plant life, land mammals are few. However, the arctic hare, arctic fox, ermine and collared lemming can be found in this region. Rock ptarmigan, hoary redpolls, snow buntings, and ringed, semipalmated and lesser golden plovers are among the few land birds that pick at insects and the rare seeds produced by plants.

Most other birds and mammals are associated with the Arctic Archipelago Marine Ecozone or the Northern Arctic Ecozone, which border the cordillera.

The Inuit seldom ventured into the frigid heights of the Arctic Cordillera, but lived quite well along its margins. Many assisted American and Scottish whalers during the 1800s, becoming quite skilled at whaling and the rendering of blubber into oil. The people in this area still depend on the bounty of the sea.

Five small communities are closely associated with the Arctic Cordillera — Grise Fiord, Pond Inlet, Clyde River, Broughton Island and Pangnirtung. Their populations are mostly Inuit and many people still practice subsistence hunting and fishing.

Tourism is important to most of these communities — Auyuittuq National Park Reserve draws many visitors each year for cross-country skiing, hiking and mountain climbing. Tourism operators specialize in guiding by boat, snowmobile and dogteam, offering trips to Auyuittuq National Park or to the floe-edge on Lancaster Sound and to the bird-cliffs on Bylot Island. Sea-kayaking is becoming popular in many areas.



Facts:

Harsh winters, long and cold.

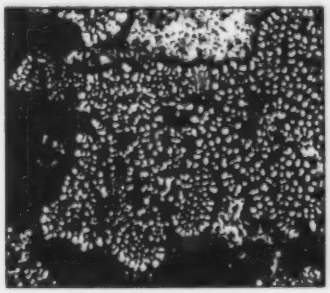
Short, cool summers.

Mean daily July temperature: + 5° C

Mean daily February temperature: - 38° C

Precipitation: 250 mm

Frost-free days: south 40, north 20



Lichens as Clocks

Slow-growing species of lichen such as the map lichen are used to measure the time elapsed since the ground has been covered by ice. To use these, it is necessary to know approximate growth rates in a given area. In the Auyuittuq area, map lichens take about 400 years to reach a diameter of 25 mm (1 in.), and then increase about 25 mm every 1,000 years.

Facts:

Very dry, cold climate, summer and winter.

Mean daily July temperature: + 5° C to + 10° C

Mean daily January temperatures: -30° C to - 35° C

Precipitation: 100 - 200 mm

Frost-free days: average 20

Inuksuk

Stone cairns dot the land in many areas of the arctic. The Inuktitut name for these is inuksuk, which means "in the likeness of a man". Rows of inuksuit served as guides to drive the caribou into a place where they could be killed with spears and arrows. Others mark meat caches, or places where tools were stored.

The bare bones of the land are revealed in all their majesty. The sheer immensity of the landscape captures the imagination in

the Far North

The Northern Arctic Ecozone is a cold desert. The ground lies in the grip of permafrost that thaws to a depth of only a few centimetres in summer. Much of the land is rolling plains covered with raw rock debris. In places there is nothing but frost-patterned soils, shattered limestone and sandstone, and bare rock outcrops.

Wide, flat plains border many coasts. Once submerged beneath the sea by the weight of the great ice sheet, the land has rebounded. However, you can still find evidence of the old shorelines far inland in formations known as strandlines or beach ridges.

In some places, hundreds of thousands of seabirds such as the thick-billed murre, black-legged kittiwakes and northern fulmars nest on sheer cliffs. Two other ecozones overlap with the Northern Arctic. The mountainous areas are part of the Arctic Cordillera. The sea is part of the Arctic Archipelago Marine Ecozone.

In this polar desert, the climate and the scouring effect of the wind are far too severe to permit a lush flora. In a few sheltered places, however, the climate is mild enough to create oases. Places like Polar Bear Pass on Bathurst Island, include tundra ponds, sedge meadows, patterned ground lowlands and heath tundra slopes. These provide habitat for Peary caribou, muskoxen, arctic hares, collared lemmings and a number of tundra-nesting birds. Arctic wolves range over huge areas. Arctic foxes patrol the sea ice in winter and the tundra in summer.

Adaptations to this severe climate are remarkable. Translucent hairs on the stems and flower bases of plants such as Arctic fleabane, woolly lousewort and mastodon flower create tiny greenhouses that allow the sun's rays to warm the plant tissues.

Muskoxen are protected by a dense undercoat called qiviut and long guard hairs that block the wind. Ptarmigan develop thick feathers on their feet in winter that act as tiny snowshoes as well as insulation. Arctic hares group together in "herds." They rely on their sheer numbers to distract predators.

Oldsquaw ducks, yellow-billed loons, snow geese, Canada geese and brant come to nest on tundra ponds or in moist coastal wetlands and river valleys. They are joined by snowy owls, jaegers, ruddy turnstones, red phalaropes, purple sandpipers, red knots and dunlins. Arctic woolly bear caterpillars freeze solid in winter and take 14 years to reach the adult moth stage.

Purple Mountain Saxifrage

Not surprisingly, the Northern Arctic Ecozone is sparsely populated. What is surprising is the sheer number of small communities — 16 in Nunavut and the western Northwest Territories alone. Most were established by fur traders in prime hunting areas for marine mammals.

Inuit form most of the population. They depend on subsistence hunting and fishing, but are increasingly involved in government, mineral exploration and mining, oil and gas development, construction, tourism and community services. Many wage-earners turn to the land and their heritage whenever possible, hunting and fishing to supplement family diets with preferred foods like caribou, fish, beluga and seal.

North of the Arctic coast lies a vast archipelago of islands, like pieces of a giant jigsaw puzzle. Through this puzzle winds the fabled

Northwest Passage

From the Beaufort Sea to Davis Strait, and south to Hudson Bay, lies a maze of channels, straits, gulfs and sounds. Bays, inlets and fiords reach inland in this region, which is known as the Arctic Archipelago Marine Ecozone.

Here, land and water create an unusual environment in which the sea becomes a barrier and a highway. For the Peary caribou, the winter sea ice provides a bridge. Open water is a barrier in summer. For marine mammals like narwhals or walrus, the open water is a highway. Large expanses of solid ice are an effective barrier.

In the brief summer, much of the sea ice shatters into massive sheets separated by narrow channels of open water called leads. The ice can, however, persist throughout the summer in an unbroken mass. In places, it fractures and drifts

onto windward shores, scouring the beaches and piling into ice mountains. Ice conditions are variable and unpredictable throughout the ecozone.

Sometimes, pack ice surrounds relatively large areas of year-round open water called polynya. Polynya are vital to life. They often occur where deep upwellings bring nutrients to the surface. This attracts krill and small fish, which become food for seals, seabirds and whales.

In springtime, the floe edge of the ice throbs with life. Eiders, oldsquaw ducks and yellow-billed loons join the cliff-nesting murres and black guillemots diving after herring and capelin. Ringed and bearded seals haul out along ice leads. Walrus, narwhal and beluga roll in the larger channels. Huge bowhead whales gulp krill and other invertebrates. Polar bears stalk the floe edge, hunting for seals.

The Arctic Archipelago Marine Ecozone was a major migration route for Paleo-Eskimos who moved into the North American Arctic almost 4,000 years ago. In a warming period about 2,000 years ago, the Thule came in from northern Alaska, following the bowhead whale. They thrived for more than a thousand years, living in large villages with permanent winter houses.

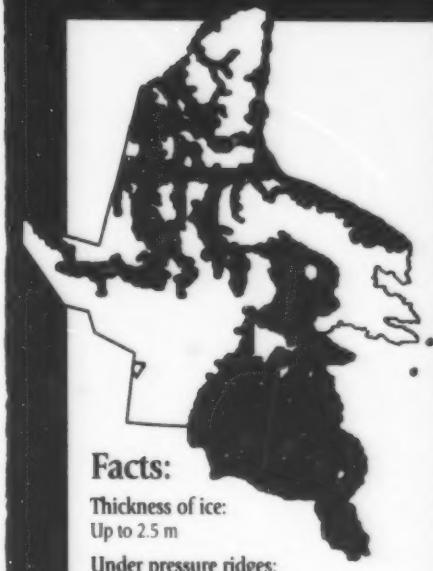
During the "Little Ice Age", around 1650 AD, the Thule abandoned whale hunting and began to depend more and more on caribou, seals, walrus and smaller whales. They eventually developed into the modern Inuit.

The Arctic Archipelago is the source of many stories of Arctic exploration, hardship, tragedy and heroism. Europeans sought the Northwest Passage for some three hundred years before the Norwegian explorer Roald Amundsen and his little ship, the Gjoa, pushed through the Simpson Strait in 1905.

Today, four communities in the western Northwest Territories and 26 in Nunavut are located on the shores of this marine ecozone. The population is predominantly Inuit. Many people still pursue traditional fishing and hunting practices, especially for whales, seals and the occasional polar bear. Muktuk, whale skin with a slight amount of blubber attached, is a treasured delicacy.

The area is growing in popularity for tourism. Dogteam and snowmobile trips, sea kayaking, boating and arctic cruises on ice-protected vessels are leading attractions. Most visitors are interested in the Inuit culture. They are also intrigued by the stories of the search for the Northwest Passage and the race for the Pole.

Great reserves of oil and gas lie beneath the Arctic Archipelago. Exploration companies also seek minerals such as nickel, lead, copper, gold and diamonds on the islands and beneath the sea.



Facts:

Thickness of ice:
Up to 2.5 m

Under pressure ridges:
Much thicker; can exceed 45 m.

Duration of ice cover:
November - July

98 % ice-cover in winter

30 % (varies with weather) under permanent pack ice

Mean daily July temperature: +10° C

Mean daily January temperature:
-30° C or lower

Arctic Marine Mammal Adaptations

Most arctic marine mammals (whales, seals, walrus) are insulated by a thick layer of blubber. All are large; it is too difficult for a small mammal to maintain body heat in the icy seas.

All store oxygen in their muscle tissue (as opposed to storing it in the lungs). These mammals are able to do a blood shift, transferring active circulation from the skin to internal organs when they dive.

Facts:

Long, cold winters.

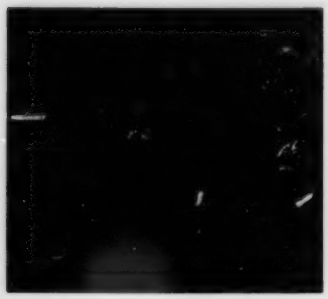
Short, cool summers, especially along the Hudson Bay coast.

Mean daily July temperature: +10° C

Mean daily January temperature: -30° C

Precipitation: 250 to 500 mm

Frost-free days: 40 to 80



The Bearberry

Bearberries, both red and black, are common throughout the Southern Arctic Ecozone. They form mats covering large areas, sometimes mixing with blueberries and cranberries. Bearberry leaves turn a vibrant scarlet in late August. The leaves of the red berry shed in the fall; those of the black berry remain on the plant until late in the winter.

The tundra rolls in a treeless sweep to the horizon. Rivers wind through wide valleys and deep gorges. Early explorers called this place...

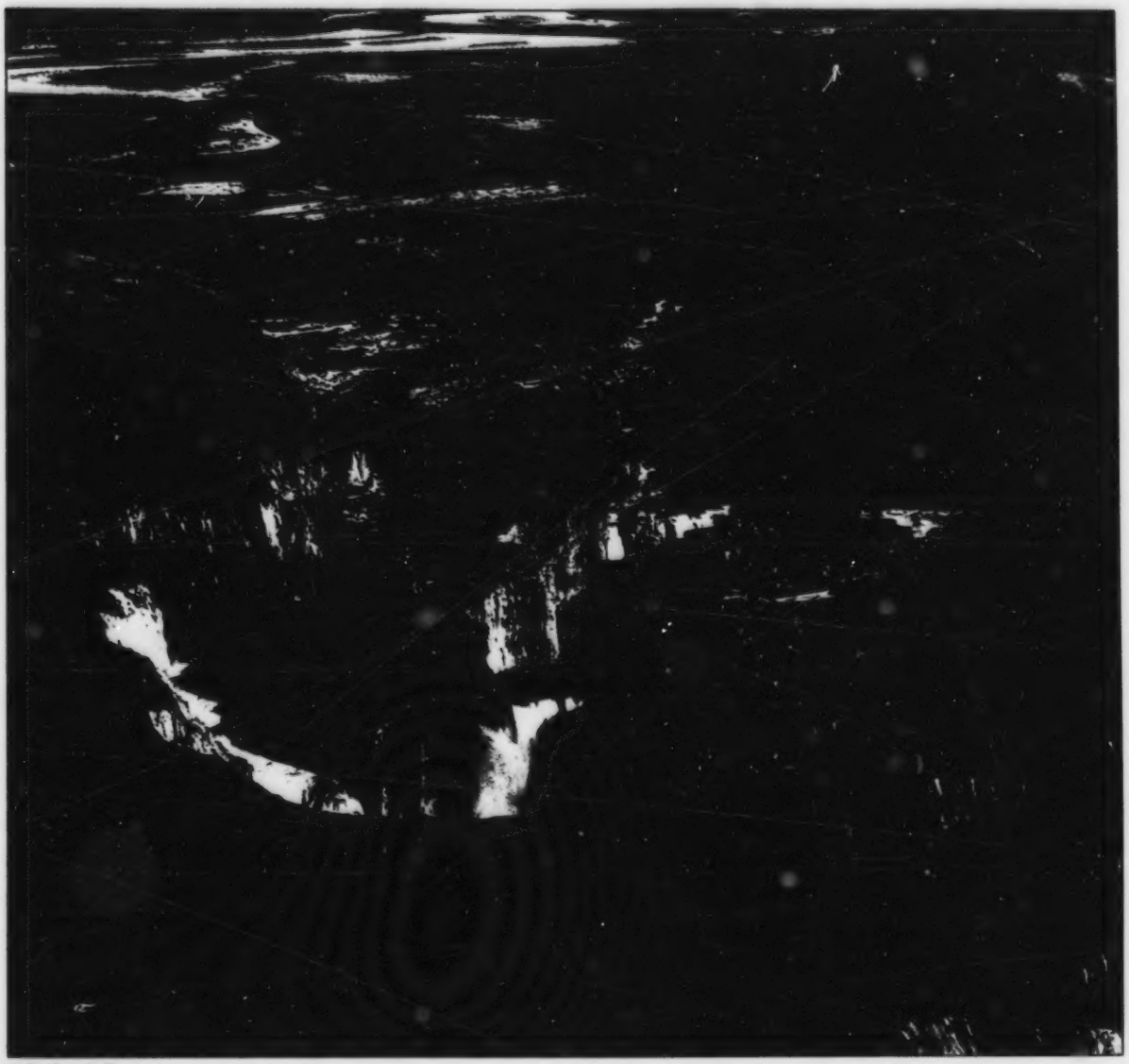
The Barrenlands

They couldn't have been more wrong. This region, also known as the Southern Arctic Ecozone, is vivid and alive. Caribou calves cavort each spring under the watchful eyes of their mothers. The summer bursts with colour as flowering plants reach for the sun. In fall, the sky fills with the sound of beating wings and the cries of migrating tundra swans, sandhill cranes and snow geese. Even the deepest reaches of winter are alive as caribou and muskox wander the uplands, pawing away the thin covering of snow to browse on the grasses and herbs beneath.

The Southern Arctic Ecozone spreads north from the treeline to the Arctic Coast, stretching east from the Yukon to Hudson Bay and on into Nunavik, the Inuit region of northern Quebec. Huge sand and gravel ridges, known as eskers, snake across this land, remnants of rivers that flowed from within the continental ice sheets that retreated more than 6,000 years ago. The ice sheets carved millions of lakes and ponds that sparkle today in the summer sun, providing habitat for nesting loons, ducks, geese, swans, shorebirds — and billions of mosquitoes, food for fledgling sandpipers and plovers.

The ground beneath the tundra is permanently frozen. The upper layer thaws only slightly in summer. Repeated thawing and freezing, and movement of the thawed layer, causes rocks to move to the surface, forming boulder fields and boulder streams. Ice in the soil creates "frost boils" and other patterns in the ground.

Despite the water trapped on top of the permafrost, the barrenlands are dry. They receive only 250-500 millimetres of precipitation annually. Plant life, nevertheless, is abundant. Where the snow cover is thin, mountain avens, bearberry, crowberry, lingonberry and alpine azalea form low mats. On sandy eskers, arctic poppies, prickly saxifrage, fairy candelabra and several mustards thrust stiff stems above low leaf rosettes. Plants such as wild sweet pea, licorice root and Lapland rosebay create a rich palette in sheltered areas during the short summer.

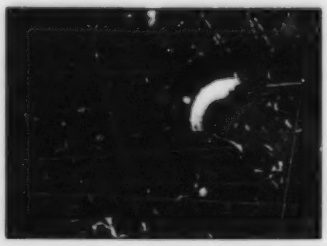


Wilberforce Falls

For thousands of years, the great caribou herds of this land have drawn hunters from both sides of the treeline: Inuit from the coast, forsaking their diet of seal, to hunt caribou at river crossings, the Dene coming up from the boreal forests in search of caribou and migrating waterfowl. Dene and Inuit still hunt here today, some for traditional "country food". Others lead sport hunters who want to share an ancient experience.

Many come to see the beauty of the tundra and its wildlife or to discover the mineral wealth hidden under the ground. The Southern Arctic Ecozone offers the promise of gold, base metals and diamonds. Through wise negotiation, it also offers the promise of jobs and careers for northern people in the years to come.

At the northern edge of the boreal forest lies the land known to the Athapaskan people as the



"Land of little sticks"

Volcanic outcrops trace back to the earliest eruptions of lava that created the earth's crust. Eons of weathering, erosion and glacial carving have removed all but the hardest rock leaving the low rounded hills of the Canadian Shield. Where permafrost occurs, the soils shift and the trees tip randomly, giving an appearance of a "drunken forest".

The Taiga Shield Ecozone occurs where the boreal forest and the Canadian Shield overlap. In wet areas, the forest is comprised of black spruce, low willows, alders, sedges and mosses. Better-drained sites support stands of white spruce, paper birch

and trembling aspen on soils carpeted by blueberry, cranberry, dwarf birch, wild rose and soapberry. Where the soil is sandy or rocky, stands of jack pine develop in the aftermath of forest fires.

Bare, rocky outcrops are covered by colonies of lichens. Twisted spruce trees, fragrant shield fern, clumps of prickly saxifrage and kinnikinnick cling tenaciously to fissures in the rocks.

Plant communities here are shaped by frequent fires, most started by lightning. The result is a patchwork of communities in different stages of succession, which renews the vitality of the forest.

In spring, ducks, geese, loons, swans, sandhill cranes and grebes flock to open water areas. Some remain to nest; most simply wait for open water before striking north across the barrenlands. Huge flocks of Canada and white-fronted geese roll like clouds over the marshes. Lesser scaup, mallards, pintails, green-winged teal and gadwalls wheel and turn in an aerial ballet. Black bears, their shiny hair rippling in the wind, splash through the tawny marshes in a hunt for spawning northern pike.

Summer brings nesting activity. Bonaparte's gulls teeter on their treetop nests and Arctic terns drop like stones into the water after small fish. Red-necked grebes and Pacific loons waddle onto low nesting platforms of marsh grasses. Muskrats munch aquatic vegetation and beavers work industriously on dams and lodges.

Moose bellow in the twilight and red squirrels scurry to stash spruce cones. Winter brings a deep silence as the aurora blazes across the sky. Silvery caribou trails meander through the bush. Voles and mice burrow in the snow, hunted by fox, weasels, pine martens, short-eared owls and goshawks.

Historically, the Taiga Shield is the country of the Dene and Metis. Few Inuit spent much time in the central barrenlands. Many migrated inland in the summers. They hunted caribou in the fall for skins to make clothes. Others travelled to the treeline to get the trunks of spruce trees, which were used for tent poles. West of Hudson Bay, small groups of Inuit lived inland along rivers that flowed from the boreal forest. They hunted caribou at the river crossings and fished when they could not get caribou.

Today, no Inuit communities are located in the Taiga Shield although some Inuit are involved in tourism businesses in the area. Sport fishing and river canoeing are growing attractions.

Facts:

Short cool summers.

Long, cold winters.

Mean daily July temperatures:
+ 7.5° C to + 17.5° C

Mean daily January temperatures:
- 17.5° C to - 27.5° C

Precipitation: 250 to 500 mm

Frost-free days: 70-100

Fireweed

Fire Ecology

Fire keeps the forest young by killing insect pests and recycling nutrients. It opens the forest floor to sunlight, encouraging pioneer plants like willows, aspens, fireweed, blueberries, raspberries and currants.

Facts:

Cold, dry winters.

Cool, brief summers.

Mean daily July temperature: +12° C

Mean daily January temperature: -25° C

Precipitation: 500 mm, 100 mm of which occurs in July.

Frost-free days: average 70

Lesser Snow Geese

With a population some three million strong, lesser snow geese are the most numerous wild geese in North America. In summer, they nest along the coasts of the Arctic Ocean and Hudson Bay. They also nest on Southampton Island and the western portion of Baffin Island. The eastern population of lesser snow geese migrates south in winter to coastal marshes in Texas and Louisiana.

Snow geese and shorebirds spiral in to land on eelgrass mudflats on James Bay's

Wetlands Sanctuaries

The Hudson Plains Ecozone reaches around the southern coast of Hudson Bay, from Churchill, Manitoba to James Bay. It is a large ecozone that includes some of the most extensive wetlands in Canada. It may well be the largest wetland on the face of the earth.

However, this ecozone barely extends into Nunavut, where it covers a number of islands and exposed reefs in James Bay. The most prominent are North and South Twin Islands and Akimiski Island.

Twin Islands are composed of gravelly glacial deposits studded with lakes, marshland and tussock tundra. Sand dunes and wide tidal flats border the shores. Small stands of white spruce, dwarf birch and willows occur on drier areas. These islands together cover an area of about 301 square kilometres.

Located off the mouth of the Attawapiskat River is the larger Akimiski Island. It covers about 1,220 square kilometres. It is low with a ridge along its steeper southern shore made of limestone and a rock called dolomite. The island slopes back to sedge marshlands and mudflats in the north. Muskeg ponds are scattered along the southern side.

These islands have been designated the Twin Islands Bird Sanctuary and the Akimiski Island Game Sanctuary. They are important in waterfowl migration, especially the migration of snow geese, Canada geese, Atlantic brant and American black ducks. These species also nest on the islands, where they are joined by oldsquaw, northern pintail, lesser scaup and green-winged teal. The area is also vital migration feeding habitat for shorebirds, including red knots, Hudsonian godwits, semipalmated plovers, dunlins, red-necked phalaropes and purple sandpipers. Arctic terns and the rare Caspian tern nest on Akimiski Island.

All these islands are summer retreats and maternity denning areas for polar bears. Open channels of water, called leads, provide wintering habitat for beluga whales off Twin Islands.

A thin fringe of islands and reefs off the eastern shore of James Bay are also part of Nunavut. This rich blend of marine, estuarine and freshwater habitat is alive with waterfowl and shorebirds throughout the time it is ice-free.

Several hundred thousand Canada geese, brant, snow geese, black ducks and at least 23 species of shorebirds utilize this ideal habitat.

The Hudson Plains are part of the traditional hunting grounds of the Cree. In the past, they have been important areas for the fur trade. The remote islands have never been highly populated by humans. Today, they are left only to the birds.

Semipalmated Sandpiper

The Hudson Plains, in General

Most of the Hudson Plains Ecozone lies outside Nunavut. It provides major waterfowl nesting and staging areas, vital to the health of geese and ducks that utilize their rich marshes.

Overall, the Hudson Plains are low, poorly drained, and almost flat. Their average elevation reaches only 120 metres. A series of parallel arcs roughly follow the contours of the land and the coastline. These are glacial strandlines, raised beaches representing sea level at various times during the Pleistocene.

Low tundra and sedge marshes extend inland about 30 kilometres from the coast, and taiga-like spruce barrens extend almost to the coast in sheltered areas, or in areas with deeper soil.

Protected Areas For Nature

An understanding of the distribution of plants and animals has always been important to people making their living off the land. Similarly, an understanding of how all the different parts of a natural neighborhood work together is essential to keeping an ecosystem healthy. Each species contributes to the web of life. Ensuring each species a place in nature ensures that the magnificence of the North will continue. Creating a system of protected areas is one way to help this happen.

While respect for nature should happen everywhere, there are some places where nature is hardest at work. Key areas such as calving grounds for caribou, nesting grounds for birds, spawning channels for fish, feeding areas for whales and denning sites for bears are crucial for these animals.

There are different kinds of protected areas. Some are strictly for the preservation of nature, others permit some carefully regulated activities, such as tourism, and some commemorate an important cultural or spiritual site. The best known kinds of protected areas are; National Parks, National Historic Sites, National Wildlife Areas, Territorial Parks, Migratory Bird Sanctuaries and Special Management Areas. Marine Protected Areas are new in Canada and recognize that we haven't concerned ourselves as much with protecting the resources of the sea as we have on land.

The North has the greatest extent of undisturbed natural areas in Canada. Unlike regions in the south, we have the opportunity of setting aside the best areas for protecting nature and culture in advance of development. The choices we make now will determine the conditions and characteristics of our land in the future.